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Sustainability in Maritime Education and Training: A Quality Standards Approach in Kenya

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ABSTRACT: The Merchant Shipping (Training and Certification) Regulations of Kenya adapt The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention) and the Standard Training, Certification, and Watchkeeping (STCW Code) for Seafarers. The STCW Convention and Code defines the quality standards at a minimum requirement as the harmonized threshold for contracting parties, which includes Kenya. Educational Institutions in Kenya primarily uses Quality Management Systems in application of quality to education and training. This is however contrary to the requirements of the STCW Convention and Code for institutions engaged in Maritime Education and Training. The paper focusses in assessing the extent of non-compliance, the circumstantial challenges and thereafter proposes a framework to address challenges in implementing Quality Standard Systems

1 INTRODUCTION

Maritime Education and Training (MET) has developed through the decades. The development has since incorporated emerging technologies, definition of competences and most important standards of quality that are to be met in training a seafarer

With the prevailing competition in the providing labor to the maritime industry especially for onboard employment, Maritime Education and Training Institutions (METIs) are compelled to be concerned with quality. Quality management has defined processes and products in many industries including the education sector. As such quality management has played a crucial role in education.

While reference [1] lends the general definition of quality to the educational process, it is important to note that the quality of education and its services need to be specific and agile to the demands of the external environment. This highlights the subjective characterization of quality in educational service. This further points to the dependence of the definition of quality in educational services through the prism of the consumer of the educational product [2]. As a result, reference [2] alludes that "quality should be estimated both through results from the offered services, and through the process itself which leads to the given result".

The STCW Convention and Code defines quality through Quality Standards Systems (QSS) under the Regulation I/8 unlike the definition through Quality Management System (QMS). The paper aims at defining the points of convergence and divergence in seafarer education and training standards relative to the application of Quality Management Systems (QMS). The then answers the question on sustainability of training and product quality to meet standards required by the maritime industry through addressing the gap between a QMS as applied in education and

training and the QSS as required for Maritime Education and Training

2 QUALITY IN EDUCATION AND TRAINING

The term quality has been defined in numerous contexts. The International Standards Organization [1] defined quality as "the totality of features and characteristics of a product or service that bears its ability to satisfy stated or implied needs." This has been further revised by the ISO 9000:2015 - Quality management systems — Fundamentals and vocabulary [2]. The philosophy of 'zero defects', reference [3] assumes homogenous effects which is not in practice the absolute truth [4]. Reference [1] hence developed what is known as his Quality Trilogy: Quality Planning, Quality Management (or Control) and Quality Implementation (or Improvement).

Quality and Total Quality Management (TQM) is a concept and philosophy that has attracted educational institutions at various levels as studies have shown [6] [7] [8] . However, the structure of QMSs define business processes. Reference [9] defines the ISO 9001 as a system that "provides a model for a quality management system which focuses on the effectiveness of the processes in a business to achieve desired results." This clearly shows the concept of "process orientation" [2]. Reference [10] argues that the "zero defects" can lead to misinterpretation of quality in an educational process and product which may eventually lead to a focus on how good the examination results are at the end of the production process. This may lead to a teaching and learning process which focusses exclusively on achieving good examination results. The product of education varies with specific requirements and distinct nature of the use of the product. This in turn requires not only compliance but in addition conformance. Conformance requires key specifications. These specifications are realized through product design and specification. This therefore means that for any product, service or process to conform to the design specification, then the consumer must be able to substantiate satisfaction of the required needs and that the needs have been ideally interpreted.

To address the gaps and challenges posed to an education system through the business oriented process, reference [11] has since developed ISO 21001:2018 Educational organizations — Management systems (EOMS) for educational organizations. The ISO 21001:2018 changes structure and introduces new terminologies in the standards. The terminologies adopted plays a key role in resonating the standards with the educational organizational it is intended to appeal to. The EOMS defines the scope of quality in education and achievement of the objectives through the ability to support the acquisition and development of competence. The general terminologies as defined by ISO 9001 creates ambiguities in usage. Reference [12] argues that "the terms "customer" and "stakeholder" are often interchangeable in the context of education. One can view the students as the customer of education especially if they are on fee-paying basis, but one can also perceive that the industries are the actual customers of education since they are the ones who will employ the "product" of education thus are the right people to measure the fitness of educational courses (curriculum, courses, etc.) to the needs of the job market." This shift in paradigm thereby enhances the suitability of the EOMS as it addresses the specific needs of an educational organization rather an organization achieving its objectives through business processes.

However, analyzing the shortfalls presented by the QMS both ISO 9001:2015 and ISO 21001:2018, we find that while the latter attempts to address the gaps in the former in relation to an educational product, structure of compliance is a gap by both within the implementation of the STCW Convention 1978 and its associated Code.

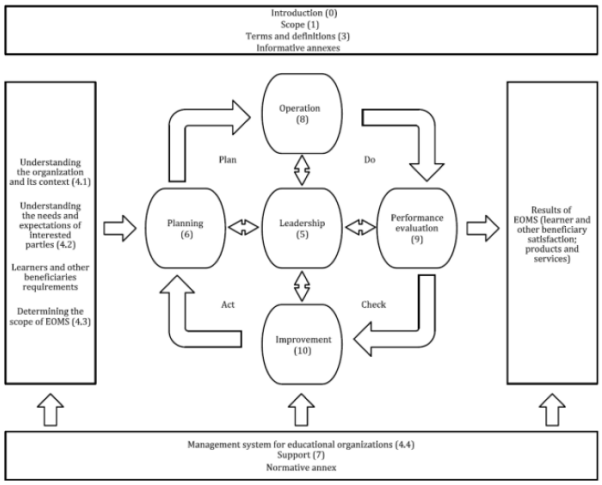

Figure 1.The PDCA cycle in EOMS ISO 21001 [11]

3 QUALITY STANDARDS SYSTEMS (QSS)

Fitness for purpose is a philosophy underpinned by the STCW Convention and Code. This is core to the process of education and training in the METIs through achievement of the competences for competency of the graduate. Thus as shown by reference [1] that the human element cannot be excluded from the quality of product, the maritime industry shifted its approach to recognition of the human element and factor [13]. Results have shown continuously shown that 80% of accidents and incidents within the maritime industry are due to human error. This places a demand for not only well educated but competent seafarers is growing day by day. Therefore, for METIs to such a supply demand beyond demand and expectations of the shipping industry, emphasis for quality must not only placed on the processes and voluntary compliance but also through structured, standardized, internationally accepted, monitored and assessed maritime education and training. This, with recognition to the international feature of the shipping industry [13].

Under the section A- I/8 "Quality Standards" of STCW Code; Parties are required to ensure that all training, assessment of competence, and certification activities are continuously monitored through a Quality Standards System (QSS)with the aim to ensure that defined objectives are achieved. An "independent evaluation" of the knowledge, understanding, skills and competence acquisition and assessment activities, as well as of the administration of the certification system, is to be conducted at intervals of not more than

five years. The evaluation must be conducted by persons who are not themselves involved in the activities concerned to verify that full effect is given to the STCW Convention and Code.

Reference [14] summaries the scope of STCW QSS as shown in the figure below:

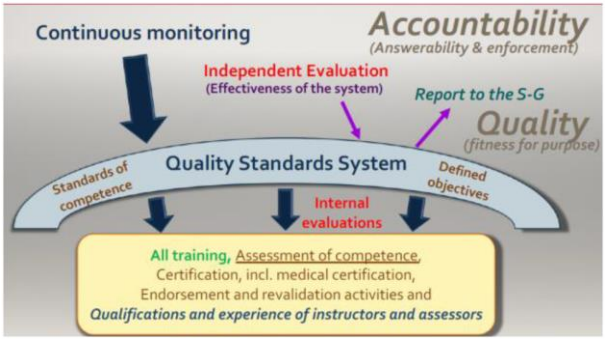

Figure 2. Summary of the requirements of the STCW QSS [14]

Key to the implementation of a QSS is the definition of accountability. Accountability is enhanced through enforcement which then establishes the level answerability, a key interpretation to the Regulation I/8-2. Answerability to the industry is induced through the Regulation B-I/6.12 on the register of approved training institutions. Reference [15] concludes that through the documentation and recoding mechanism as defined by regulation I/8, the traceability and transparency of certification is achieved.

4 SUSTAINABILITY APPROACH TO QUALITY MANAGEMENT IN METIS

The discussion and debates on how to define sustainability is a constant wheel in motion albeit the definitions of the World Commission on Environment and Development (WCED). Sustainability became a central to the discussions on environment [16]. To understand the concept of sustainability, Reference [17] argue that sustainability is a prediction problem more than a definition problem. Reference [18] terms it as "a consummately effective 'boundary term'". Looking at the definition of reference [19], we find that maintaining, restoring and renewing to guarantee quality of process and product provides a platform upon which we build the concept of sustainability not only in education but in Maritime Education and Training (MET).

4.1 *System's Approach*

Reference [20] supports systems thinking in education and argues that its application as a mental tool of understanding shows how sub-components of a whole influence one another "so that resolving problems within one part of education should neither negatively impact the performance of other areas nor create unforeseen consequences". To address quality standards rather than quality management, tools and resources upon which the achievement of the competences must be defined within the structure of the system. In addition, the processes and assurances are defined objectively in line with the requirements to achieve knowledge, understanding and proficiency.

Sustaining quality needs identification of the components to realize such quality and the critical analysis of the individual needs of such components and their expected synergy to function as a system. Therefore, the inquiry of the components is key to the evaluation of quality in training. This further enhances quality and effectiveness of the training process through a directional focus on "the goals of the organization, the resources needed to achieve these goals, and the relationship between the organization and its environment" [21].

4.2 *Sustainability Framework*

Identifying the consumer of a product is key to quality of such products. Reference [1] in his nine-step roadmap to achieve the ideal of quality, identified than in order to satisfy the needs of the customer, you need to develop a product that meets their needs through a suitable process to create the product. Therefore, the implementation of Quality Standard System is desired in such a manner that the consumer of the product of MET which is the global maritime industry fraternity is able to see in the product, satisfaction of their need.

To understand the requirements for a sustainable quality standard system, the Table 1 below shows a mapping matrix of STCW QSS against the ISO9001 and ISO21001.

Table 1. Table of comparative analysis of the ISO 9001, 21001 and STCW QSS requirements

	ISO 9001:2015	ISO 21001:2018	STCW QSS
Resources		defines "learning resources"	A description of training facilities and equipment
Customer Satisfaction	Relates the customer with generic product quality definition	Defined within the scope of education: learners	Satisfaction defined with Competency
Defining the customer	Defines in a generic scope	Defines customer as 'Learners and other beneficiaries'	Defined in the trainee and the consumer (administration, shipping fraternity)
Compliance scope	The customer quality requirements	The customer quality requirements	statutory
Quality management functions	Generic definition	Definitions relative to education	Defines the Responsible Persons
Details of academic and training strategies in use	Not incorporated.	Defines associated attributes to curriculum	Defined and mandatory
An outline of the policies and procedures	Defined in a generic scope	Defined in educational scope	Defined in competence specific scope
Achieving learning outcomes (competency)	none	Defines learning outcomes	Defines requirements for achieving competency
Evaluation	periodic	periodic	periodic, mandatory
Accounta-bility	x	x	defined

Form the table we realize that resources to achieve educational goals and competences is defined in both ISO21001 and the STCW QSS, while it is not defined in ISO9001. Definitions within the framework of both the ISO2001 and STCW QSS is defined within the scope of objectives of the product which then enhances the systems as relevant to the product as defined "fit for purpose" rather than generic acquisition of product description. However, the accountability of such system is not explicitly defined and apportioned in both ISO9001 and ISO2001, a fact that makes the STCW QSS a unique tool in addressing quality of the product, in this sense the seafarer.

5 A MARITIME EDUCATION AND TRAINING (MET) STANDARD OPERATING PROCEDURES (SOP)

From the analysis and comparison, we find the following to be relevant to the MET SOP framework:

1. Definition of terms specific to the maritime training industry
   While the ISO 2001 defines education terms and concepts, it is devoid of maritime specific terms which gives meaning to processes and documents. The SOP therefore shall include definitions of key terms and concepts that are specific to MET
2. Defining QSS
   It is important that the SOP defines the essence and compliance of the QSS. This forms the basis of approvals of MTIs, hence the need for clarity of MET specific processes and procedures.
3. Defining the audit system and process under the requirements of QSS
4. Defining the Responsible Persons (RPs, D/RPs)
   This is key to the management and administration of the training. The RP and the deputy bear the responsibility to ensure quality, hence addressing the aspect of accountability.
5. Defining regulatory compliance for instructors.
   This includes competency and proficiency of instructors as required by the STCW Convention Regulation I/6 and also addresses the requirements of Regulation I/8
6. Defining competence and competency
   This is key to the pedagogical process including assessment. Through this, we find that the STCW Code Tables of competence defines the competence, the achievement of the competence through Knowledge, Understanding and Proficiency, the criteria for assessment and the tools to use for assessment.
7. Defining control of non-conforming services
   Defining the audit process and processes for corrective action is an important element in ensuring quality. Therefore, for such a system to be a Quality Standard System, the inclusion of the control mechanism and framework is essential.
8. Defining continuous competence development
   Continuous competence development is key to knowledge dissemination, hence the reality of ensuring continuous learning. The QSS must therefore 8address the formalities and methodology for continuous learning for instructors to enhance organizational learning and knowledge management.
9. Defining scope and applicable standards.

6 CONCLUSIONS

The practice of implementing QMS at educational institutions presents key challenges in defining processes within the scope of education. Further, the challenges are then transferred to MET in particular. These challenges are induced subconsciously into the MET system which has been superimposed on existing educational framework. While these has addressed quality of processes, it is still lacking in addressing quality of product defined on competency and statutory compliance. Statutory compliance addresses the harmonization of quality to a standard acceptable by the industry hence achieving mobility. The STCW Convention and Code defines quality within the premise of "fitness for purpose". This therefore

Qualitative analysis of current quality systems shows gaps in implementation of a QSS as defined by the STCW Convention and Code, it is practical and rational that duplication of system is unnecessary. The approach is proposed for MET specific processes, thereby defined within an SOP following the guidelines of the STCW Code Section B-I/8 as regulated by the STCW Convention Regulation I/8 in the requirements set by STCW Code Section A-I/8.

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